Remarks

Claims 1- 31 are currently under examination in the application. Claims 1-31 are rejected. Reconsideration of claims 1-31 is respectfully requested.

Amended Claims

Claims 13, 15, 16, and 17 have been amended by the removal of the word "the".

Claim 26 has been amended with the insertion of the term SOP-realigning to clarify that it is a realignment process.

Claim 27 has been amended, by insertion of another step, to clarify that the output will be vacant at the time the packet exits the FDL, i.e., a packet in the FDL will only be transmitted to a vacant output, thus allowing already scheduled packet at the output to finish its transmission.

Claim Rejections - 35 U.S.C 112

Claims 1-31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter not described in the specification.

Claim 1

In the Office Action, it is mentioned that claim 1 recites that the SOP of each complete packet functions as a label indicating a QoS value for that packet. The specification supports sending different QoS packets on different polarizations, but SOPs of packets functioning as labels is new matter.

However, in claim 1 the term label is used about an entity bearing specific information, which in this case is information about the type of QoS. The use of the word label

in claim 1 is for underlining that it is the SOP of the complete packet that informs about the type of QoS the packet have.

Furthermore, the term label is a common word used for an entity bearing specific information. In the application, paragraph [0006] lines 4-13, paragraph [0007] and paragraph [0062] lines 6-8 give examples on label used as an information entity.

Hence, label is a common word which is mentioned in the specification and the use of it in claim 1 does not add new subject matter.

Claim 7

In the Office Action, it is pointed out that claim 7 recites that the optical switching matrix is adapted to separate packets of a first QoS class and payload and header information of a second QoS. An optical switching matrix that routes packets of one QoS on a packet basis and packets of another QoS on a sub packet basis is new matter.

However, in the application paragraph [0040] it is mentioned that header and payload within each package is separated by orthogonal states of polarization. In addition, paragraph [0041] states that QoS classes are separated by assigning different priority to packages to be processed, and thus they have different polarization on the transmitter side. Figure 1 shows also how the states of polarization may be used for optical separation between two different QoS classes.

Further, paragraph [0044] discusses packets of different QoS, GS and BE being assigned different SOP's, i.e., SOP '1' and SOP '2' respectively. These packets can be separated from e.g., Best Effort (BE) packets by transmitting BE packets in SOP '2', while GS packets are transmitted in the SOP '1', like in Figure 2."

Furthermore, interleaving packets of different polarization, according to their SOP is discussed also in the description of the experimental demonstration, paragraph [0048] lines 4-7 which state that segregation of packets belonging to different QoS classes is done by modulating only one transmitter at a time, leaving the other in CW mode.

Additionally, paragraph [0045] and paragraph [0050] lines 1-6 discusses how GS packets are forwarded according to their wavelength while BE packets are routed according to their header.

Claims 12 and 14

In the Office Action, it is mentioned that claim 12 recites that the network arrangement is adapted for more than two states of polarization for signaling traffic. The specification only enables signaling based on two states of polarization, with two-state polarization beam splitters. Furthermore in claim 14, the specification does not teach how to use the change of states of polarization for the purpose of separating different QoS. In other words, is it is not explained how a change over time of two already distinct states of polarization could be the causal agent of a separation event that separates QoS not already separated.

However, these subjects are mentioned in the description. In Figure 3, paragraph [0047] and paragraph [0072] lines 5-7, the egress node and the switch is described. In the egress node, any change in SOP at the input of the PBS may be used for indicating a change in the QoS value. The change at the input of the PBS will result in a change of the amplitude of Ch.1 and Ch.2 of the PBS output. Hence, there can obviously be several, more than two, changes of the amplitude of Ch.1 and Ch.2. Each change can be defined to represent a certain QoS value such as BE or GS and with more than two QoS values additional QoS can be defined.

More specific, the changes will be a measure telling what type of service is requested. The packet signal is power split on Ch.1 and Ch.2 and thus, enters the receiver through both channels. The receiver is able to decode the content of the packet using either of the channels. Furthermore, the receiver is able to distinguish between the QoS classes through monitoring the power levels on each of its two input interfaces. Therefore, as mentioned in paragraph [0072] lines 5-7, when a QoS packet arrives at the input of the switch, a change in state of polarization will be detected and the switch can detect and separate between different QoS.

Claim Rejections - 35 U.S.C 103

Claims 1, 2, 4, 5-8, 18, 19, 21, 22, 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodialam (US 2002/0018264) in view of Van Der Tol (US 5,900,957) and further in view of Handelman (US 2003/0048506).

A review of these three publications and the combination of them gives the following result.

Kodialam teaches transmitting packets of different QoS, with different QoS labels, in an optical network.

Van Der Tol teaches a system where header and payload separation is performed optically assigning orthogonal SOP's to the header and the payload respectively.

Handelman discloses using orthogonal polarizations to merge two polarized packets into a single wavelength for achieving double bandwidth.

The combination of these publications gives the option of two different systems.

Kodialam together with Handelman gives a system where packets of different QoS bears a QoS label as described in Kodialam, i.e., the label is not given by the optical SOP of the packet. These packets are then multiplexed into two orthogonal states of polarization regardless of their QoS-

value, because the purpose is to double the bandwidth. Furthermore, since the bandwidth of a QoS-class may vary, i.e., the required bandwidth for the BE-class may typically be higher than the bandwidth of the GS-class, the doubling of bandwidth is not achieved if the packets are assigned SOP according to their QoS-class. This type of assignment may result in much less than a doubling of the bandwidth since any leftover capacity in either the GS or the BE polarization channel may not be utilized by filling up the capacity with packets of a different QoS. In this case, it means filling up the capacity with BE packets in the GS channel or GS packets in the BE channel. For achieving the doubling of the bandwidth, which is the purpose of Handelman, SOP may therefore not be applied for indicating the QoS of the packet.

Combining Kodialam together with Van Der Tool gives another system where packets labeled with a non-optical QoS value may utilize the SOP for separating the header and the payload of the packet. SOP is in this case not applied for QoS separation because it is already applied for header and payload separation. A mechanism for applying SOP for simultaneous separate header and payload, QoS or packet separation, is not described in these patents.

Finally, the combination of Kodialam together with Van Der Tool and further with Handelman would imply a system where packets are labeled with a embedded non-optical QoS value and where the header and payload is separated using the SOP. The use of Handelman, in such a system, would further imply that packets are transmitted simultaneously on two states of polarization with the purpose of achieving a doubling of the bandwidth. There would then be a conflict resulting in interference between the header of a packet and the payload of a different packet, transmitted in the orthogonal SOP to the header. In other words, if a payload is transmitted in SOP 1, its header transmitted in SOP 2 will

interfere and have a conflict with the payloads transmitted in SOP 2.

Therefore, to conclude, Van Der Tool and Handelman cannot be combined for achieving a working system, and Kodialam and Handelman cannot be combined for achieving optical QoS separation through applying the SOP. Both the functionality and the optical behavior of the system described in the application is therefore different from the systems, described in each of these publications, as well as the systems achievable through combining the principles described in these publications.

Claims 1 and 18

Regarding claims 1 and 18, Kodialam teaches in paragraphs 23, 25 and 28 a communication network arrangement for handling packets within optical or combined optical/electrical packet switched networks comprising at least an ingress node adapted to multiplex optical packets and an egress node adapted to demultiplex received optical packets, characterized in that the ingress node has means for transmitting packets of a first QoS class, and transmitting packets of a second QoS.

However, Kodialam does not teach transmitting different QoS signals on different states of polarization. Kodialam teaches only the transmission of packets of different QoS, with different QoS labels embedded in the packet, in an optical network.

Further, Van Der Tol in column 6, lines 1-13, column 3, lines 12-20 and Figure 1 teaches a system where a transmitted packet's payload and header are multiplexed based orthogonal polarization and where the received packet's payload and header are multiplexed accordingly. Furthermore, the combination of Kodialam and Van Der Tol disclose using different polarizations for a packet headers and payloads.

However, Van Der Tol teaches only a system where header and payload separation is performed optically assigning orthogonal SOP's to the header and the payload respectively.

As discussed earlier, combining Kodialam together with Van Der Tool gives a system where packets labeled with a non-optical QoS value may utilize the SOP for separating the header and the payload of the packet. SOP in this case will not be applied for QoS separation because it is already applied for header and payload separation. A mechanism for applying SOP for simultaneous separate header and payload, QoS or packet separation, is not described in these two publications.

Handelman in claims 20 and 21 discloses using orthogonal polarization to merge two polarized packets into a single wavelength channel. One of the ordinary skill in the art at the time of the invention could have used orthogonal polarization to merge two polarized packets of the combination into a single wavelength channel, and each wavelength channel could have double bandwidth.

It is correct that Handleman discloses using orthogonal polarizations to merge two polarized packets into a single wavelength channel. However, the combination of Kodialam together with Handelman gives a system where packets of different QoS bears a QoS label as described in Kodialam, i.e., the label is not given by the optical SOP of the packet. These packets are then multiplexed into two orthogonal states of polarization regardless of their QoS-value, because the purpose is to double the bandwidth. Furthermore, since the bandwidth of a QoS-class may vary, i.e., the required bandwidth for the BE-class may typically be higher than the bandwidth of the GS-class, the doubling of bandwidth is not achieved if the packets are assigned SOP according to their QoS-class. This type of assignment may result in much less than a doubling of the bandwidth since any leftover capacity

in either the GS or the BE polarization channel may not be utilized by filling up the capacity with packets of a BE or GS quality respectively. For achieving the doubling of the bandwidth, which is the purpose of Handelman, SOP may therefore not be applied for indicating the QoS of the packet.

Since Kodialam together with Handelman gives a system where packets cannot assign SOP according to their QoS-class and Kodialam together with Van Der Tool gives a system without QoS separation, because SOP is already applied for header and payload separation, the publications are viewed as non-applicable.

Applicant therefore respectfully asks for reconsideration of claims 1 and 18 as they are considered to be allowable.

Claim 2 and 19

Regarding claims 2 and 19, Kodialam, Handleman and Van Der Tol in column 6, lines 44-67 and Figure 1 teach that the ingress node while transmitting said packets of second type in said second state of polarization, has means for simultaneously transmitting a header in a first state of polarization.

However, as discussed earlier, the combination of Kodialam together with Van Der Tool and further with Handelman gives a system where packets are labeled with an embedded non-optical QoS value and where the header and payload is separated using the SOP. The use of Handelman, in such a system, suggests that packets are transmitted simultaneously on two states of polarization with the purpose of achieving a doubling of the bandwidth. There would then be a conflict resulting in interference between the header of a packet and the payload of a different packet, transmitted in the orthogonal SOP to the header. In other words, if a payload is transmitted in SOP 1, its header transmitted in SOP 2 will

interfere and have a conflict with the payloads transmitted in SOP 2.

As such, the principles described in Kodialam, Van Der Tool and Handelman cannot be combined to produce a working system.

<u>Claims 4 and 21</u>

Regarding claims 4 and 21, Kodialam and Handleman in claims 20 and 21 and Van Der Tol in Figure 1 and column 6, lines 1-13 teach that second and first state of polarization are substantially orthogonal states.

Applicant agrees that states of polarization are orthogonal states, but as discussed earlier Kodialam, Van Der Tool and Handelman cannot be combined to produce a working system.

Furthermore, claims 4 and 21 depends on allowable claims 1 and 18 respectively and are thus also allowable.

<u>Claims 5 and 22</u>

Regarding claims 5 and 22, Kodialam and Handleman in claims 20 and 21 and Van Der Tol in Figure 1 and column 6, lines 44-50 teach SOP alignment means for the received packet and polarization means for demultiplexing the received packets, and polarization means for multiplexing packets for forwarding.

However, as discussed earlier, Van Der Tool and Handelman cannot be combined for achieving a working system, and Kodialam and Handelman cannot be combined for achieving optical QoS separation through applying the SOP.

Furthermore, claims 5 and 22 depends on allowable claims 1 and 18 respectively and are thus also allowable.

Claim 6

Regarding claim 6, Kodialam, Handleman and Van Der Tol in column 6, lines 42-52 teach one core node adapted to split the received packets by polarization and to separate packets according to the packets state of polarization.

However, it is not the complete packets that are separated by polarization, as required by the subject claims of the present application, but rather data and address components within each individual packet that are separated by Van der Tol. In the application, complete packets are separated by polarization.

It is further stated that Van Der Tol in column 6, lines 52-55 describes a core node with a first optical switching matrix and a second electronic switching matrix.

However, Van Der Tol clearly discusses only an optical switching matrix. In column 6, line 52-53, Van Der Tol cites that from the electrical address signal a control signal is derived. In other words, the topic discussed is only an electronic control signal and not an electronic switching matrix. Furthermore, column 6, line 55 describes clearly only an optical switch.

Claim 7

Regarding claim 7, Kodialam, Handelman and Van Der Tool in column 6, lines 52-67 teach that the optical switching matrix is a wavelength router adapted to separate packets of a first class, payload of a second class and header information of the second class.

However, what Van Der Tool describes is the separating of address and data components of a packet by wavelength with the address part being used to control the switching of the data component in the switching matrix. Whereas claim 7 separate only whole packets in the first state

of polarization and both header and payload in second state of polarization.

Furthermore, as discussed earlier, the combination of Kodialam together with Van Der Tool and further with Handelman gives a system where packets are labeled with an embedded non-optical QoS value and where the header and payload is separated using the SOP. The use of Handelman, in such a system, would further imply that packets are transmitted simultaneously on two states of polarization with the purpose of achieving a doubling of the bandwidth. There would then be a conflict resulting in interference between the header of a packet and the payload of a different packet, transmitted in the orthogonal SOP to the header. In other words, if a payload is transmitted in SOP 1, its header transmitted in SOP 2 will interfere and have a conflict with the payloads transmitted in SOP 2. In the application, interference is avoided by using interleaving of packets, i.e., packets are not transmitted simultaneously on two states of polarization.

As such, Van Der Tool and Handelman cannot be combined for achieving a working system, and Kodialam and Handelman cannot be combined for achieving optical QoS separation through applying the SOP.

Additionally, the argumentation that cited portion of the specification does not disclose an optical switching matrix that routes packet of one QoS on a packet basis and packet of another QoS on a sub-packet basis, is not correct. Claim 7 has support in the specification, which discloses the said operation in paragraphs [0044], [0045] and [0050]. In the explanation, GS packets are forwarded according to their wavelength while BE packets are routed according to their header.

Claim 8

Regarding claim 8, Kodialam, Handelman and Van Der Tool teach a network arrangement which comprises at least one core node, said core node having at least one polarization beam splitter and at least one optical beam demultiplexer.

The arrangement is employed for a new application and to solve a problem that has not been solved previously, namely how to separate packets of different QoS class. Van Der Tool in column 5, lines 54-65 uses instead such an arrangement to multiplex and demultiplex an address signal A and a data signal I, two portions of the same packet, based on polarization. There is given no information about separating complete packets of different QoS class.

Claim 26

Regarding claim 26, Van Der Tol in column 6, lines 44-50 teaches a polarization beam splitter oriented so that the polarization components are split correctly.

However, in claim 26 the polarization of packets are re-aligned, while Van-Der Tool describes only aligning the polarization of the signal for the purpose of doing a splitting according to the polarization. Hence, claim 26 covers the recombination of the split signals, i.e., for sending it further into the network. This re-alignment is not covered by Van-Der Tool.

Nevertheless, claim 26 has been amended to clarify that it is a re-alignment process.

Claim 27

Regarding claim 27, Kodialam, Handelman and Van Der Tool in columns 52-67 teach that when a first packet of a first QoS class arrives at a switch the following steps are carried out: a controlling device registering that the first packet is present at the input, then delaying the first packet

in a FDL in a first pre-determined period of time, and reserving an output where the first packet is directed to be transmitted.

Applicant agrees that the mentioned steps can be found in Van der Tol publication, and has therefore amended claim 27 by introducing another step which limits the scope of the claim.

Claims 10 and 30

Regarding claims 10 and 30, dependent on the independent claims 1 and 18 respectively, Fang in paragraph [0007] teaches a network systems with IP traffic for best effort service and traffic for guaranteed service, albeit in different types of networks i.e., ATM overlay for best effort service, but MPLS based packet switching for guaranteed service.

In the application, BE packets are assigned to second QoS class, while GS packets are assigned to the first QoS class, and thus are given different states of polarization based on these QoS assignments. Assigning different services to separate states of polarization is not obvious in view of assigning different services to separate network systems.

Conclusion

Applicant requests reconsideration of the claims in view of the amendments and remarks made herein. A Notice of Allowance is earnestly solicited.

The Examiner is requested to contact the undersigned attorney prior to an Office action at 408-297-9733 between 9:00 AM and 5:00 PM PST.

You are authorized to charge any fee deficiency or credit any overpayment to Deposit Account No. 19-0590.

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I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing System in accordance with § 1.6(a)(4).

Signed: Sally Azevedo
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